

DETAILED ACTION

Claim Objections

1. Claims 3, 5,8 are objected to because of the following informalities: The claims are objected to because they include reference characters which are enclosed within parentheses but are essential elements in the claims. Therefore, examiner suggest applicant remove the parenthesis in order to give weight to the elements taught in the claims . Appropriate correction is required.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: Figures 1, 3,12, and 13 includes reference number "3" which was not described in the specification. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 4 and 7 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 4 recites “relative position is formed adjustable according to a first rule” and claim 7 recites “determined according to a second rule”. The “first rule” and the “second rule” are not clearly described. Since the rules are considered to include optional rules according to the description claims 4 and 7 are not sufficiently supported by the specification.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

- Claims 3, 5, and 8 are rejected as failing to define the invention in the manner required by 35 U.S.C. 112, second paragraph. The claim(s) are narrative in form and replete with indefinite and functional or operational language. The structure which goes to make up the device must be clearly and positively specified. The structure must be organized and correlated in such a manner as to present a complete operative device. The claim(s) must be in one sentence form only. Note the format of the claims in the patent(s) cited. Claims should be written as a single

Art Unit: 2624

sentence. Claims 3,5 and 8 have two periods, and it is unclear how the language following the colon relates to or further defines the claimed invention.

Examiner Notes

6. Examiner cites particular columns and line numbers in the references as applied to the claims below for the convenience of the applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested that, in preparing responses, the applicant fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the examiner

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tangen et al (6,765,617) and in view of Suda et al (US 7,262,799).

As to claim 1, Tangen et al. teaches the image input apparatus comprising: a micro-lens array having a plurality of micro-lenses (figure 1, micro lenses or the lenslets L, the camera objective system being shown as an array of four lenses L1-L4, column 8, lines 31-37); and a light detecting element facing said micro-lens array (D1-D4, column 8, lines 31-61) wherein a single object image of an subject is obtained (Each lens L generates an image of the scene to be imaged with the desired total resolution in the final image), by rearranging image information of a plurality of object reduced images focused on a prescribed region on said light detecting element by said micro-lens array, and a relative position between said micro-lens and said prescribed region on said light detecting element (The common image plane I where the detectors D.sub.1 -D.sub.4 are provided, is rendered spaced apart from the common infinite conjugate focal plane of the lens array, the focal plane F and the image plane I, of course, being coextensive for an image object which is located at infinite distance, fig 1, column 8, lines 31-65), on which said object reduced images are focused as responding to each one of said micro-lenses, is arrayed differently for each of said micro-lens (note that The sensor elements E hence determine the sampled areas of the surface of each image plane I of the lenses L.sub.1 -L.sub.4, as these areas mutually are positioned relative to the image such that they complement each other in a composite mosaic picture, column 9, lines 1-16 and column 13, lines 1-32). While Tangen et al meets a number of the limitations of the claimed invention, as pointed out more fully above, Tangen fails to specifically teach the relative position between said micro-lens and the prescribed region". Specifically, Suda et al. teaches in addition to the distance measurement device, 465, figure 21, an image sensing apparatus with an image sensing element having first and second image sensing areas with substantially the same size on a single plane, a photographing optical

Art Unit: 2624

system that respectively forms first and second object images on the first and second image sensing areas, and a signal processing device that processes an output signal from the image sensing element, and each of the first and second image sensing areas has a matrix of a plurality of pixels arranged at a pitch a in the horizontal direction and a pitch b in the vertical direction on a light-receiving surface, the first and second image sensing areas have a positional relationship in which the first and second image sensing areas are separated $a \cdot h \cdot c$ in the horizontal direction and $b \cdot c$ in the vertical direction. It would have been obvious to one of ordinary skill in the art to shift the imaging elements by a predetermined distance in Tange in order to enhance image resolution. Therefore, the claimed invention would have been obvious to one of ordinary skill in the art at the time of the invention by applicant.

As to claim 2 and 5, Suda et al. teaches an image input apparatus according to claim 1, wherein said relative position shifts sequentially at specified quantity in vertical and horizontal directions in an array of said micro-lenses (figure 27)

As to claims 3- 4, Tange et al teaches the image input apparatus according to claim 1, wherein said relative position is formed adjustable according to a first rule based on a distance between said micro-lens and said subject (the linear distance to the optical axis is given by $d/2 = (\sqrt{n_x^2 + n_y^2})^{1/2}$, $w/2$ (4) , column 3, lines 36-60)

As to claim 6, Tange et al teaches the image input apparatus according to claim 1, wherein, in process of obtaining a single object image by rearranging said image information of a plurality of object reduced images focused on said prescribed region on said light detecting element per said micro-lens, rearranged positions on said object image, to where said image

information of said object reduced images are rearranged, are determined on the basis of said relative position (figures 1a and figure 1b).

As to claim 7, Suda et al. teaches an image input apparatus according to claim 1, wherein, in process of obtaining a single object image by rearranging said image information of a plurality of object reduced images focused on said prescribed region on said light detecting element per said micro-lens, said rearranged positions on said object image, to where said image information of said object reduced images are rearranged, are determined according to a second rule on the basis of a distance between said micro-lens and said subject (figure 8).

As to claim 8, Suda et al. teaches image input apparatus according to claim 7, wherein said second rule is that said relative position shifts sequentially by $(s/N-D/m)$ in vertical and horizontal directions in said micro-lens array. s indicates a pitch of said light detecting element, N indicates a number of units of said micro-lens, D indicates a pitch of said micro-lens, and m indicates a magnification of said micro-lens for said subject. Also, m indicates a ratio $(b/a=m)$ of distance (b) between said micro-lens and said subject to a distance a between said micro-lens and said light detecting element (and each of the first and second image sensing areas has a matrix of a plurality of pixels arranged at a pitch a in the horizontal direction and a pitch b in the vertical direction on a light-receiving surface, the first and second image sensing areas have a positional relationship in which the first and second image sensing areas are separated $a \times h \times c$ in the horizontal direction and $b \times c$ in the vertical direction (where h is a positive integer), the image sensing element forms first and second images which are formed to have an identical spectral distribution and have substantially the same fields of

view, and the signal processing device generates a composite image signal based on the first and second images, column 2, lines 54-67).

As to claim 9, Tangen et al teaches the image input apparatus according to claim 1, wherein said light detecting element contains a plurality of light detecting cells, and said light detecting cells are divided into a plurality of regions to which color filters are disposed respectively (FIG. 4a shows in a side view a means in an embodiment of the camera according to the invention with the optical filters between the lens array and the detector device. To each lens L.sub.1, L.sub.2, . . . there is in this case provided a respective filter F1.sub.R, F1.sub.B, F1.sub.G, each of these filters as shown in front view of FIG. 4b being assigned to respectively groups of three and three lenses L.sub.1,L.sub.2,L.sub.3 ; L.sub.4,L.sub.5,L.sub.6 ; L.sub.7,L.sub.8,L.sub.9 in the lens array).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NANCY BITAR whose telephone number is (571)270-1041. The examiner can normally be reached on Mon-Fri (7:30a.m. to 5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 571-272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Andrew W. Johns/
Primary Examiner, Art Unit 2624

Nancy Bitar

06/12/2008